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*XVII. Description of a new Marine Animal. In a Letter from Mr. Everard Home, Surgeon, to John Hunter, Esq. F.R.S. With a Postscript by Mr. Hunter, containing anatomical Remarks upon the same.*

Read March 7, 1785.

TO JOHN HUNTER, ESQ. F.R.S.

DEAR SIR,

Sept. 20, 1784.

I SENT you, about three years ago, a sea animal from Barbadoes, which was unlike any one I had ever seen. From the want of books and other information in that island, I was unable at the time to find out, whether it was a new acquisition, or had been described by any authors in natural history.

Since my arrival in England, I have examined the libraries of some men of science for an account of this animal, and have made other enquiries among the naturalists, without success. The specimen I sent you was found on a part of the coast which had undergone very remarkable changes, in consequence of a violent hurricane. These changes were indeed the means of its being discovered, and present a probable reason why it was not discovered before. The extraordinary circumstances which brought it within our reach, and the silence of all the authors on natural history which I have been able to consult, incline me to believe it to be a non-descript. As the peculiarities of its structure may add to the knowledge of the natural history

history of other animals of this genus, at present so little understood, I have drawn out a more particular account of it; which, if you think it deserves attention, you may present to the Royal Society.

This animal was found on the south-east coast of Barbadoes, close to Charles Fort, about a mile from Bridge Town, in some shoal water, separated from the sea by the stones and sand thrown up by the dreadful hurricane, which happened in the year 1780, and did so much mischief to the island.

The wind, in the beginning of the storm, which was in the afternoon, blew very furiously from the north-west, making a prodigious swell in the sea; and in the middle of the night changing suddenly to the south-east, it blew from that quarter upon the sea, already agitated, forcing it upon the shore with so much violence, that it threw down the rampart of Fort Charles, which was opposed to it, although thirty feet broad, by the bursting of one sea. It forced up, at the same time, immense quantities of large coral rocks from the bottom of the bay, making a reef along this part of the coast for the extent of several miles, at only a few yards distance from the shore.

The soundings of the harbour were found afterwards to be intirely changed, by the quantity of materials removed from the bottom in different places. In the reef of coral was found an infinite number of large pieces of brain-stone, containing the shell of this animal; but the animals had either been long dead, or more probably destroyed by the motion of the rocks in the storm: some few of the brain-stones, however, that had been thrown beyond the reef, and lodged in the shoal water, receiving less injury, the animals were preserved unhurt.

The animal, with the shell, is almost intirely inclosed in the brain-stone, so that at the depth in which they generally lie,

they are hardly discernible, through the water, from the common surface of the brain-stone; but when in search of food they throw out two cones, with membranes twisted round them in a spiral manner, which have a loose fringed edge, looking at the bottom of the sea like two flowers; and in this state they were discovered.

The species of *Actinia* called in Barbadoes the Animal Flower, and common to many parts of that island, although rarely before seen on this part of the coast, was now found in considerable numbers in this shoal water.

The animal was first observed by Captain HENDIE, the officer commanding Fort Charles, in looking for shells which were thrown up in great numbers from the bottom of the harbour. He found a piece of brain-stone containing three of them in different parts of it. Some little time after, I was lucky enough to find another brain-stone with two in it; one of them is the specimen in your possession; the other was destined for examination, of which the following is the account.

The animal, when taken out of the shell, including the two cones and their membranes, is five inches in length; of which the body is three inches and three-quarters, and the apparatus for catching its prey, which may be considered as its tentacula, about an inch and a quarter.

The body of the animal is attached to its shell, for about three-quarters of an inch in length, at the anterior part where the two cones arise, by means of two cartilaginous substances, with one side adapted to the body of the animal, the other to the internal surface of the shell: the rest of the body is unattached, of a darkish white colour, about half an inch broad, a little flattened, and rather narrower towards the tail. The muscular fibres upon its back are transverse; those on the belly

longitudinal, making a band the whole length of the body, on the edge of which the transverse fibres running across the back terminate.

The two cartilaginous substances by which the animal adheres to its shell, are placed one on each side of the body, and are joined together upon the back of the animal at their posterior edges: they are about three-quarters of an inch long, are very narrow at their anterior end; becoming broader as they go backwards; and at their posterior end they are the whole breadth of the body of the animal. Upon their external surface there are six transverse ridges, or narrow folds; and along their external edges, at the end or termination of each ridge, is a little eminence resembling the point of a hair pencil, so that on each side of the animal there are six of these little projecting studs, for the purpose of adhering to the sides of the shell in which the animal is inclosed. The internal surfaces of these cartilages are firmly attached to the body of the animal, in their middle part, by a kind of band or ligament; but the upper and lower ends are lying loose.

From the end of the body, between the two upper ends of these cartilages, arise what I suppose to be the tentacula, consisting of two cones, each having a spiral membrane twining round it: they are close to each other at their bases, and diverge as they rise up, being about an inch and a quarter in length, and nearly one-sixth of an inch in thickness at their base, and gradually diminishing till they terminate in points. The membranes which twine round these cones also take their origin from the body of the animal, and make five spiral turns and a half round each, being lost in the points of the cones; they are loose from the cone at the lowest spiral turn which they make, and are nearly half an inch in breadth; they are exceedingly

ingly delicate, and have at small distances fibres running across them from their attachment at the stem to the loose edge, which gives them a ribbed appearance. These fibres are continued about one-tenth of an inch beyond the membrane, having their edges finely serrated, like the tentacula of the *Actiniae* found in Barbadoes: these tentacula shorten as the spiral turns become smaller, and are entirely lost in that part of the membrane which terminates in the point of the cone.

Behind the origin of these cones arises a small shell, which, for one-sixth of an inch from its attachment to the animal, is very slender: it is about three quarters of an inch in length, becoming considerably broader at the other end, which is flat, and about one-third of an inch broad; the flattened extremity is covered with a kind of hair, and has rising out of it two small claws, about one-sixth of an inch in length. If the hair, and mucus entangled in it, be taken away, this extremity of the shell becomes concave, is of a pink colour, and the two claws rising out from its middle part have each three short branches, not unlike the horns of a deer. The body of this shell has a soft cartilaginous covering, with an irregular but polished surface: on this the cones rest in their collapsed state, in which state the whole of the shell is drawn into the cavity of the brain-stone, excepting the flattened end with the two claws.

Before the cones there is a thin membrane, which appears to be of the same length with the shell just described. In the collapsed state it lies between the cones and the shell in which the animal is inclosed; but, when the tentacula are thrown out, it is also protruded.

The shell of this animal is a tube, which is very thin, and adapted to its body: the internal surface is smooth, and of a

pinkish white colour : its outer surface is covered by the brain-stone in which it is inclosed, and the turnings and windings which it makes are very numerous. The end of the shell, which opens externally, rises above the surface of the stone on one side half an inch in height, for about half the circumference of the aperture, bending a little forwards over it, and becoming narrower and narrower as it goes up, terminating at last in a point just over the center of the opening of the shell ; on the other side it forms a round margin to the surface of the brain-stone. This part of the shell is much thicker and stronger than that part which is inclosed in the brain-stone : its outer surface is of a darkish brown colour ; its inner of a pinkish white.

The animal, when at rest, is wholly concealed in its shell ; but when it seeks for food, the moveable shell is pushed slowly out with the cones and their membranes in a collapsed state ; and when the whole is exposed, the moveable shell falls a little back, and the membrane round each of the cones is expanded, the tentacula at the bases of the cones having just room enough to move without touching one another. The thin membrane which lay between the cones and the inclosing shell is protruded in the form of a fold, and lies over the external shell which projects from the brain-stone.

The membranes have a slow spiral motion, which continues during the whole time of their being expanded ; and the tentacula upon their edges are in constant action. The motion of the membrane of the one cone seems to be a little different from that of the other, and they change from the one kind of motion to the other alternately, a variation in the colour of the membrane at the same time taking place, either becoming a shade lighter or darker ; and this change in the colour, while

the

the whole is in motion, produces a pleasing effect, and is most striking when the sun is very bright. The membranes, however, at some particular times appear to be of the same colour.

While the membranes are in motion, a little mucus is often separated from the tentacula at the point of the cone. Upon the least motion being given to the water, the cones are immediately, and very suddenly, drawn in.

This apparatus for catching food is the most delicate and complicated that I have seen; but I shall not trouble you with any conjectures upon what that food may be, as I have not attained sufficient knowledge of the animal to speak with the smallest certainty.

I have endeavoured to describe the external appearances as I saw them; and have annexed two drawings of the animal in its two different states, one in search of food, and one while lying at rest; these are a little magnified, to show the parts more distinctly.

I shall not say any thing of the internal parts, or their uses, as the animal is in your possession, who are so much better able to explain its internal œconomy.

I am, &c.

EVERARD HOME

POST.



## P O S T S C R I P T,

BY JOHN HUNTER, ESQ. F. R. S.

ANIMALS which come from foreign countries, and cannot be brought to England alive, must be kept in spirits to preserve them from putrefaction, which makes them less fitted for anatomical examination; for the spirits, which preserve them, produce a change in many of their properties, and alter the natural colours, and texture of the parts, so that often the structure alone of the animal can be ascertained; and where this is not naturally distinct, it becomes frequently intirely obscured, and the texture of the finer parts is wholly destroyed, requiring a very extensive knowledge of such parts in animals at large, to assist us in bringing them to light: this happens to be the case with the animal whose dissection is the subject of this Postscript.

The animal may be said to consist of a fleshy covering, a stomach and intestinal canal, and the two cones with their tentacula and moveable shell, which last may be considered as appendages.

The body of the animal is flattened, and terminates in two edges, which are intersected by rugæ, the fasciculi of transverse muscular fibres which run across the back being continued over them. Upon each of these edges is placed a row of fine hairs, which project to some distance from the skin.

The fleshy covering consists principally of muscular fibres: those upon the back are placed transversely, to contract the body laterally.

laterally; those on the belly longitudinally, to shorten the animal when stretched out, and to draw it into the shell.

The stomach and intestine make one straight canal: the anterior end of this forms the mouth, which opens into the grooves made by the spiral turns of the tentacula round the stem of each of the cones; and the intestine at the posterior end opens externally, forming the anus. From the contracted state of the animal, the intestine is thrown into a number of folds.

On examining the cones and the tentacula, I at first believed that the spiral form arose from their being in a contracted state; and that, when the tentacula were erected, the cone untwisted, forming a longer cone with the tentacula arising from its sides, like the plume from the stem of a feather; and that this stem was drawn in or shortened by means of a muscle passing along the center, which threw the tentacula into a spiral line, similar to the penis's of many birds; but how far this is really the case, I have not been able to ascertain.

The internal structure of this animal, like most of those which have tentacula, is very simple; it differs, however, materially from many, in having an anus, most animals of this tribe, as the Polypi, having only one opening, by which the food is received, and the excrementitious part of it also afterwards thrown out; this we must have supposed, from analogy, to take place in the animal which is here described, more particularly since it is inclosed in a hard shell, at the bottom of which there appears to be no outlet; but as there is an anus this cannot be the case.

It is very singular, that in the Leach, Polypi, &c. where no apparent inconvenience can arise from having an anus, there is not one, while in this animal, where it would seem to be attended with many, we find one; but there being no anus

in the Leach, Polypi, &c. may depend upon some circumstance in the animal œconomy which we are at present not fully acquainted with.

The univalves, whose bodies are under similar circumstances respecting the shell with this animal, have the intestine reflected back, and the anus, by that means, brought near to the external opening of the shell, the more readily to discharge the excrement; and although this structure, in these animals, appears to be solely intended to answer that purpose, yet when we find the same structure in the black Snail, which has no shell, this reasoning will not wholly apply, and we must refer it to some other intention in the animal œconomy.

In this animal we must therefore rest satisfied that the disadvantageous situation of the anus, with respect to the excrement's being discharged from the shell, answers some purpose in the œconomy of the animal, which more than counter-balances the inconveniences produced by it.

It would appear, from considering all the circumstances, that the excrement thrown out at the anus must pass from the tail along the inside of the tube, between it and the body of the animal, till it comes to the external opening of the shell, as there is no other evident mode of discharging it.

How the tube or shell is formed in stone or coral is not easily ascertained. It may be asked, whether this animal has the power of boring backwards as the *Teredo Navalis* probably does, or whether the stone or coral is formed at the same time with the animal, and grows and increases with it: and if we consider all the circumstances, this last would appear to be most probable, and agree best with the different phænomena; for the coral is lined with a shell, which could not be the case if the animal was continually increasing this hole, both in length and  
breadth,

breadth, in proportion to its growth; but if the coral and the animal increase together, it is then similar to the growth of all shells, whether bivalve or univalve.

The animal does not appear to have the power of increasing its canal, being only composed of soft parts. This, however, is no argument against its doing it, for every shell fish has the power of removing a part of its shell, so as to adapt the new and the old together; which is not done by any mechanical power, but by absorption.

The tribe of animals which have tentacula consists of an almost infinite variety, and many of the species have been described. Of that kind, however, which has the double cones, I believe hitherto no account has been given. It is most probably to be found in the seas surrounding the different islands in the West Indies; for I received an animal, some years ago, from Mr. OLIVER, surgeon, at Tenby in Pembroke-shire, which he had procured from a gentleman at St. Vincent's; which, upon examination, proves to be the same animal with that above described, only that the moveable shell is wanting.

Since I began this Postscript, I find there is a description of a double-coned *Terebella*, published by the rev. Mr. CORDNER, at Bamf in Scotland, which was found upon that coast; in which the cones have their tentacula passing out from the end, and when erected they spread from the cone as from a center. This proves that the double-coned tentacula also have different species.

## EXPLANATION OF THE FIGURES, TAB. XI.

## FIG. I.

A drawing of the animal after death, as it appeared in spirits, a little magnified.

A. The under side of the body.

BB. The cartilages which attach the animal to the sides of the cavity in which it lies.

C. One of the cones covered by its membrane in a collapsed state.

D. The lowest spiral turn of the membrane and its tentacula spread out.

EE. The cut edges of the divided membrane, which are turned on each side to shew the cone.

F. The cone as it appears in the intervals between the spiral turns of the membrane.

G. The moveable shell, with the smooth cartilaginous covering, in an outside view.

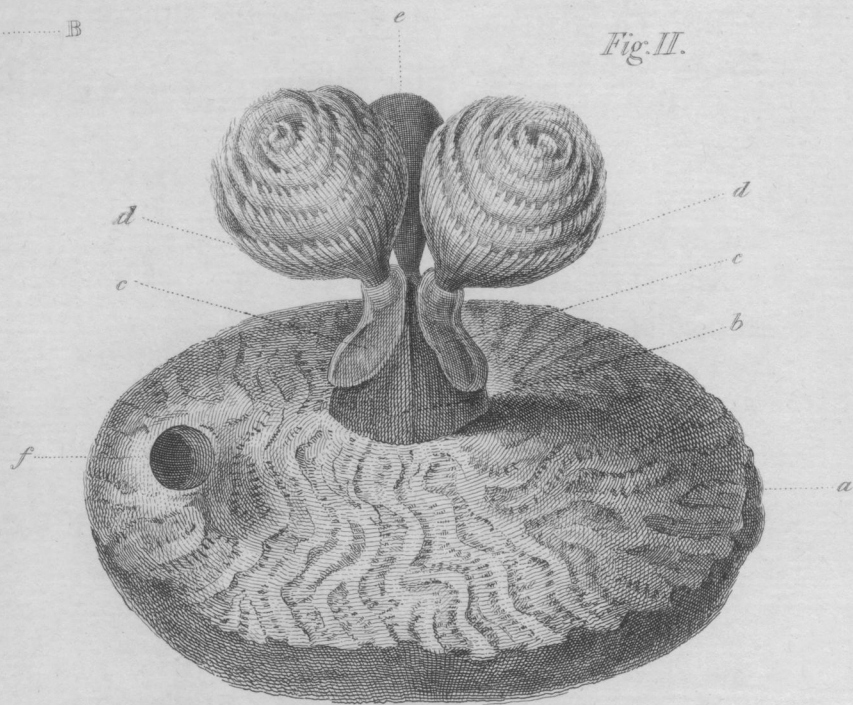
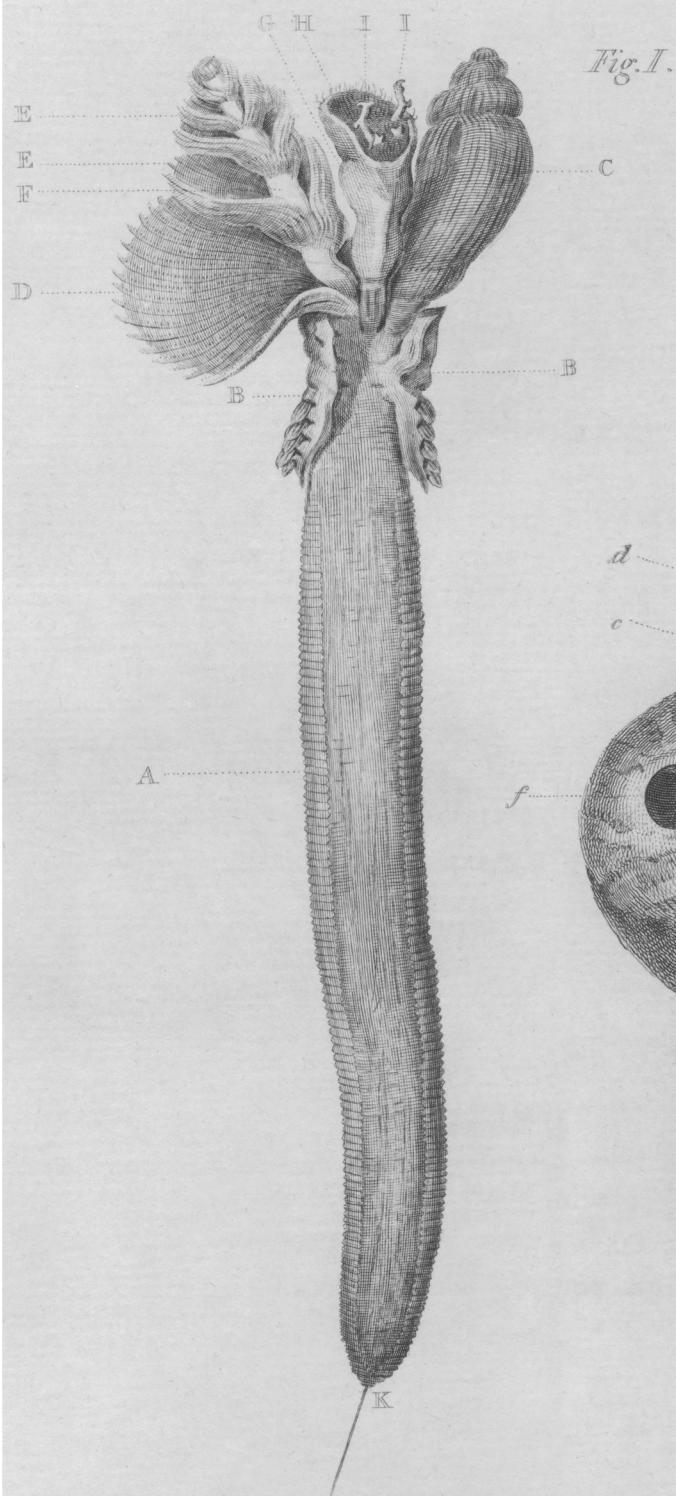
H. The flattened end of the moveable shell, with hair upon it.

II. The two claws that arise from the surface of the flattened end of the moveable shell.

K. The anus, into which a hog's bristle is introduced.

## FIG. II.

A drawing of the animal, with its tentacula expanded in search of food, as it appears in the sea; taken from a sketch made in Barbadoes, where no draughtsman could be procured while



while the animal was alive. This also is larger than the animal.

*a.* The sort of brain-stone in which the animal was discovered.

*b.* The external prominent shell.

*cc.* The membrane which is protruded with the cones and moveable shell, and makes a fold over the edges of the prominent shell.

*dd.* The membranes and tentacula in a state of expansion.

*e.* The inner side of the moveable shell, as it appears when protruded.

*f.* The hole in the brain-stone as it appears when the prominent shell is broken off, and which may be seen in many specimens of brain-stone.

